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Let’s Build the Future Together

Gary Martz - Sr. Director Intel Foundry Services
May 5th, 2022
Innovative Foundry with Global Scale

We will offer a broad portfolio to the market ...

... with a customer-centric business model ...

... accelerated by the power of Intel®

0.5nm to leading edge silicon technology and advanced 3D Packaging

Multi-ISA support X86 | Arm | RISC-V

Robust IP ecosystem Intel + 3rd party

Industry leading innovations: Chiplet Open Platform, LIDAR

Relentless focus on customer service and co-development

Flexible commercial models tailored to customer needs

Industry-focused technology platforms Auto | Mobile | Compute

$1B IFS Innovation fund in partnership with Intel Capital

Deep technology & manufacturing expertise

Robust supply chain at scale

Only US-based foundry with leading-edge R&D

Globally diverse manufacturing footprint
Intel Foundry Services – Complete Solutions

<table>
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<tr>
<th>Intel differentiators available through IFS</th>
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<tr>
<td>Any Intel Core or Accelerator</td>
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<tr>
<td>Any Intel Packaging</td>
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<tr>
<td>Design Services</td>
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<tr>
<td>Any Eco-system Core</td>
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<td>OSAT network</td>
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<tr>
<td>Broad Eco-system IP Offering</td>
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<tr>
<td>Design Enablement</td>
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<td>Manufacturing</td>
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World-class foundry offering leveraging the eco-system

Secure supply
Worldwide Factory Network

Robust, geo-diverse supply for wafer and packaging

- 6 Global wafer fabrication sites: US, EU, and Israel
- 6 Global assembly and test locations
- Investing in both the US and EU

- $20B for new manufacturing in Ohio
- $20B for new manufacturing in Arizona
- $3.5B for advanced packaging in New Mexico
- As much as 80 billion euros in the EU over the next decade
  - Manufacturing and foundry services in Ireland, Italy, Poland and Spain
  - 17B Euro for new manufacturing in Germany
  - 12B Euros for Ireland fab expansion
  - New R&D and design hub in France
RISC-V Growth
Currently 2,700+ RISC-V Members

- **106 Chip**
  - SoC, IP, FPGA

- **3 Systems**
  - ODM, OEM

- **2k+ Individuals**
  - RISC-V Engineers and Advocates

- **3 I/O**
  - SoC, IP, FPGA

- **13 Industry**
  - Cloud, Mobile, HPC, ML, Automotive

- **18 Services**
  - Fab, Design Services

- **109 Research**
  - Universities, Labs, other Alliances

- **52 Software**
  - Dev Tools, Firmware, OS

Source: RISC-V International
Semico Research has estimated that Demand will continue to grow at a rapid pace, with the market consuming more than 60 billion RISC-V CPU cores by 2025.

Source: Semico Research - “Analyzing the RISC-V CPU Market for SiP, SoCs, AI and Design Starts” Feb'22
Equity investments in disruptive start-ups
Strategic investments for scale partnerships
Ecosystem investments for IFS scale

Target applications
- Next-gen leaders of semiconductors (AI/ML/DL, Auto)
- IP Providers
- RISC-V ecosystem
- Semiconductor Devices
- Semiconductor Tools/EDA
- Semiconductor manufacturing Equipment/Materials
- Chiplet ecosystem / Next-gen packaging
Working Together
Enabling the growth of the RISC-V Ecosystem

SoC Architecture
- Boot, Security, and FW resilience
- Isolation/Partitioning
- Power and Thermal Management
- Virtualization
- Confidential Computing
- Reliability, Availability, Serviceability
- Performance monitoring, telemetry, debug and trace

Semiconductor Growth

Open Software
- Applications
- Operating System
- Virtualization
- BIOS
- Firmware
- Tools & Compilers

Strategic Collaboration
$1B Innovation Fund
Enabling the growth of the RISC-V Ecosystem

**SoC Architecture**

- Boot, Security, and FW resilience
- Isolation/Partitioning
- Power and Thermal Management
- Virtualization
- Confidential Computing
- Reliability, Availability, Serviceability
- Performance monitoring, telemetry, debug and trace

**HW Innovation**

- Robust E2E secure solutions
- Minimize fragmentation
- Standard internal buses for various bus types
- Fabrics infrastructure for multi-core architecture and coherency for low power to high-performance markets
- Holistic debug solutions and interfaces to cover hardware and software requirements
- Optimize segment specific SoC architecture, e.g. Datacenter RAS, Security, Automotive ASIL-B/D, Mobile Power Management
Enabling the growth of the RISC-V Ecosystem

Open Software

- Applications
- Operating System
- Virtualization
- BIOS
- Firmware
- Tools & Compilers

Applications

- Data Tools
- Databases, NOSQL, Big Data Tools

Optimized Runtime Libraries & Frameworks

- General, Security, Graphics, ML, ...

Managed Runtimes

- Containers

Optimized System Libraries

- Operating Systems
- Hypervisors
- Boot

Advanced Tools

- More Compilers, Optimizers, Profilers

Simulators

- GRM, Sparta

Basic Tools

- Compilers, Binutils

Specification

- readable Specs, SAIL, Architecture tests, Best Practices, Tooling, Integrated Formal Model

Discrete components

Components used to build other components

Included in components above it
IFS RISC-V Ecosystem Enablement

Grow RISC-V Ecosystem

Horse Creek Silicon

IFS Partners

SiFive
P550

SiFive
P550

VÉNTANA MICRO
VT I

SiFive
P550

High Performance

Scale up RISC-V AI

Embedded Core

Applications
AI, Storage, NW, Web Tier, Control

Operating System
Ubuntu, Fedora, Suse, Android

Virtualization
KVM, Docker

BIOS
U-Boot, Linux, UEFI

Firmware
OpenF80

Tools & Compilers
GDB, GCC, LLVM

Andes Technology
AX45
Thank you